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ABSTRACT

Although there is unanimity among educators that art and art education exert a positive influence on children, diverse philosophical, social, and psychological views and values have inhibited the formation of teaching goals and strategies that acknowledge the emotional and cognitive significance of visual art. The general aims of art education have been to develop students' visual, artistic, and aesthetic perceptions and to enhance their abilities in visual expression and production. Art establishes a close connection between emotional response and cognitive action, a relationship recently investigated by research into cerebral dominance. Aesthetic perceptions are an individuals' interpretation of reality. These perceptions produce an emotional response which should be encouraged. The development of artistic and aesthetic experience increases knowledge. Visually-transmitted knowledge would seem more permanent and meaningful than verbal information, since it clarifies an image of reality that can be internalized. By encouraging the development of perception, evaluation, and activity in visual art education, both visual and verbal information processing are enhanced. (FG)

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No. 55

March 1981

Inkeri Sava

EMOTION AND COGNITION IN VISUAL ART EDUCATION

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RESEARCH BULLETIN

Institute of Education, University of Helsinki
Head: Erkki A. Niskanen, Professor of Education
Fabianinkatu 28, SF-00100 Helsinki 10, Finland

Inkeri Sava

EMOTION AND COGNITION IN VISUAL ART EDUCATION

Helsinki 1981

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"He, all alone in his fine being, had known himself akin to Goldmund, though in every outer thing the lad was his opposite. Narziss was dark and thin of face, and Goldmund open and radiant as a flower. Narziss was a thinker and anatomizer, Goldmund a dreamer and a child. Yet things common to both could bridge these differences."

(Hermann Hesse: Narziss and Goldmund)

I INTRODUCTION

In considerations involving education there seems to exist a relatively great unanimity about the fact that art and art education exert a positive influence on the development of the child. The arguments on which this view is based, however, may vary considerably depending on the historical date and the underlying philosphic, social and psychological views and values.

So long as the economic, technological, ideological and social situation demanded from education the transmission of primarily such practical skills as were necessary for coping with everyday tasks, the practical function of art as skilfully performed handwork was emphasized in general visual art education. The technical and economical development of this century in western countries has caused the human being to become less and less dependent on the work of his own hands for survival. The importance of visual art in developing the skill of the hand decreased and education of this area had to search for other tasks.

The conception of art education was affected by the liberalistic child-centred views in the ideology of education of the beginning and middle of this century. These views considered the task of education to be to support the free and natural development of the child. Art education was even seen as an essential part of the whole system of education. The furthering of free and spontaneous development was considered possible with the aid of artistic self-expression, presuming that the creative process be not tampered with too much by instruction (Read 1943, 1970; Lowenfeld 1953).

The status of art education and the importance it was seen to have in general education was affected also by the striving towards efficiency and scientification of formal school education. As a consequence of the great scientific and technical changes, there appeared the striving towards a systematic, objective, and rational investigation of phenomena

and maximal accuracy of measurement. The system of evaluation in schools strove to develop methods to measure pupil performance as accurately as possible. The demand to state the aims of education in terms of observable pupil behaviour was emphasized (see e.g. Davies 1976). This implied that such aims and contents which were impossible to state in terms of external pupil behaviour were relegated to a secondary position. The art subjects were included in this group of subject areas which were not easily operationalizable.

The striving towards efficiency in school education was also associated with the conception of the utilitarian and intermediating nature of the subject matter handled in school. The importance of this matter was considered directly proportional to the effect it had on the growth of the economic and thereby the social well-being of individuals and society. In school education a central position was accorded to such aims and contents that were thought to maximize this utility. This meant in practice the general opinion that "practical people, successful people, people who really count in our society, do not have time to take art seriously" (Lavatelli et al. 1972, 271).

The empirical research in psychology and education of the middle of this century was interested in the external behaviour of man. It was not, however, able to disregard its main object, the human mind. Thus the empiristic ideology of measuring was connected with its object by operationalizing it by means of different kind of tests and the responses the subject gave to them. Of these modes of operationalization of central import to art education were the creativity measurements, where creativity was defined primarily as fluency of ideation and the production of original responses to the stimulus items of creativity tests (e.g. Guilford 1968; Torrance 1966). The formal and theoretical nature of school education placed the development of divergent creativity into a fascinating position as a central aim of education. Applying such a conception of developing creativity to theoretical subjects would have called for a thorough re-evaluation of their contents, their methods of instruction and their modes of pupil evaluation. Thus a solution was seen in the utilization of the art subjects in the exercise of this creative fluency and spontaneous self-expression: it is evident that expression is a central feature of art and art subjects have been relatively free from the limitations set for the theor-

etical subjects by textbooks and systems of evaluation. The art subjects were considered a counter-balance to theoretical school education to relieve the frustrations caused by them. The importance of the art subjects was consequently seen as a mainly therapeutical activity focusing on the emotional or affective domain.

In the 1970's the criticism of one-sided empirical psychological and educational research and western utilitarian social ideology gained momentum. Along with this criticism there increased the doubt as to whether creative self-expression is an acceptable aim for education at all (see e.g. Eisner 1972; White 1972; Häyrynen 1974). People interested in art and art education became concerned about the fact that the art subjects had primarily been defined as therapeutical subjects, which were capable of affecting children's feelings but not their intellectual activity. There began a discussion of the arts as a cognitive, i.e. intellectual and information processing activity (see e.g. McFee 1970; Perkins and Leondar 1977; Madeja 1977, 1978; Eisner 1979; but also Dewey as early as 1934). The emphasis of the cognitive function of visual art has also been affected by the increase of the significance of visual communication in the daily life of people due to the development of the mass media (see e.g. Grünewald-Sengstmann 1973; Ehmer 1974; Schütz 1975). An emphasis on the cognitive dimension - information giving and communicative - of art can also be seen in the conception of the significance of art and art education as a central medium for the development of human social and cultural consciousness (see particularly the proponents of Marxian educational ideology, Ojala 1974; Zis 1976).

As in the case of research on creativity, the research carried in the field of psychology must partly be seen as the background for the emphasis on the cognitive dimension of art. The research of cognitive and humanistic psychology (see e.g. Singer 1977; Bugelski 1977; Horowitz 1978; Singer-Pope 1978) has rediscovered images and imagination as central objects of interest after they had been out of bounds for scientific investigation in the behaviouristic S-R -paradigm of research.

The Aim of This Report

The decision as to which of the arguments discussed are to be emphasized has a decisive effect on concrete educational planning, the formulation of goals and the recommendation of teaching strategies and consequently on the position of art education in general education. Since the emotional and cognitive dimensions of art seem to be a central object of debate, it is appropriate to consider what they mean in the context of art and art education and what role they seem to play in educational practice.

The aim of this report is to describe and evaluate aspects of the emotional and cognitive significance of art and art education for the development of pupils. Even though our following arguments are partly applicable to all art forms, we shall concentrate on investigating the area of visual art education.

First we make a short survey of the concepts used in connexion with visual art education. Next we consider some views of emotions and cognition and their meaning in the context of visual art education. Thus a foundation is set on which we finally base an evaluation of the significance of visual art education as a part of general education.

This report is a part of a project performed jointly by the Institute of Education of the University of Helsinki and the Department of Art Education of the University of Industrial Arts. The purpose of the project is to investigate the implementation of the curriculum of visual art education at the elementary level (grades 1 - 6) of the Finnish comprehensive school and the problems associated with it.

II CONCEPTS OF VISUAL ART EDUCATION

Like the concepts of the whole field of education, the concepts associated with art education are so-called open concepts, which have no final and unequivocal content. They vary depending on different philosophic, social and psychological views and the historical period in which their definition takes place. There is, on the other hand, no need to exaggerate this openness. There does exist a relatively broad unanimity about the use of several central concepts in the field of education and art. In this context it is not possible to elaborate at length on the different views which have appeared in the terminology of art education. More detailed information about these views can be found in the literature (see e.g. Langer 1953; Smith 1970; Broudy 1970; Walters 1974; Berlyne 1974; Schütz 1975; Gardner 1975; Brothwell 1976; Viljo 1976; Ruohotie 1977; Korsmeyer 1977; Oksala 1978; Saarnivaara 1979). In what follows I present a summary of the ways in which the central terms of visual art education have been defined and related to each other in the last years.

Art education (which became a commonly used term in the 1960's for instance in Finland) has been defined in relation to general education, aesthetic education and so-called creativity education. The relations have been considered in different ways depending on which aspect of art and education has been emphasized. The conception of education as ultimately art and aesthetic activity extended the concept of art education to be nearly synonymous with the concept of general education (Read 1943: the term education through art). Generally, however, art education is seen as only that part of general education, which is given in formal school education and in various guided free-time activities focusing on the specific art subjects.

Art education, particularly in the past, has often been regarded as a synonym for aesthetic education. Nowadays aesthetic education is considered a wider concept than art education. As a general term "aesthetic" is not limited to art. The object of aesthetic perception, experiencing

and appreciation can be nature, man, or man-made articles, which include art and art objects as only one, even though central part. A general aesthetic education does not per se yet provide any artistic skills. Thus artistic activity can be seen as a part of aesthetic education.

The views of the significance of art as a medium for developing the spontaneous creativity of the child contained implicitly a view of art education as nearly identical with creativity education. When the view about exhibiting creativity in all human and personal activity gained emphasis, art education became limited to only one, even though central part of creativity education.

It has often been remarked that there are features in art and art education which are neither aesthetic nor particularly creative. Accepting this kind of view means a critical attitude to the conception of art education being totally a part of aesthetic and/or creativity education. If we consider the cultural history of art, we note that art has at all times exhibited also other, e.g. religious, political, and practical functions. Having these kind of functions means, that art acts as a medium of pursuing these other aims. Artistic-aesthetic qualities have significance only to the extent that they serve the pursuing of these aims.

Art education has often been understood to mean only visual art education (see e.g. Fitzgerald 1974; Schütz 1975). In the last years the concept of art education has gained greater scope in different parts of the world and encompasses also other fields of art. Thus art education is generally understood to signify the educational activity in the visual arts, literature, drama, music and dancing both within the bounds of formal school education and in free-time educational activities.

The visual arts are generally defined as that field of art in which lines, colours, forms, and their structures, motions and their mutual relations are used to create visually perceptible works intended to represent art. The visual arts are considered to include besides the traditional visual fine arts (painting, drawing, and sculpture), also architectural art, industrial art design and cinematographical and photographical arts (Brotnwell 1976; Hassi 1979). All of these art

forms are areas of visual art education for instance in Finland. In addition, also visual mass media education and environmental education as well as calligraphy are considered content areas of visual art education as a school subject in Finnish comprehensive school.

In considering the content areas described above, somewhat differing taxonomies have been developed in attempts to define the aims and tasks of visual art education (see e.g. Wilson 1972; Eisner 1972; Pickering 1975; Silverman 1976). Based on these taxonomies, the general aims of visual art education as a school subject can be summarized as the development of visual-artistic-aesthetic 1) perception, experiencing and appreciation, and 2) expressing/producing. In the field of visual art, expressing can include, besides visual expression, verbal expression in contemplating art and in discussing art and artistic experiences. Which of the aims is possibly emphasized, is dependent on the various arguments underlying the setting of aims.

III EMOTION AND COGNITION IN VISUAL ARTS

A glance at the history of philosophy of art education shows, that the opposition between art education as an activity appealing to emotions on the one hand and the so-called theoretical subjects as an intellectual activity supplying information on the other, is by no means novel. The view of two mutually opposite ways of structuring reality - the scientific and the artistic way - has its roots in the ancient dualism between intellectual and personal or emotional factors as determinants of human behaviour. This opposition is also reflected in our everyday use of terms which are closely associated with the pair of concepts art - science:

artistic : the skilfull, emotional, subjective, intuitive, holistic, structuring of the world based on direct sensory perception,

scientific: cognitive, rational, intellectual, objective, logical, systematic, analytical, abstract, conceptual thought.

The Bloomian way of thinking in terms of taxonomies of objectives made a conceptual distinction between the cognitive, the affective, and the psychomotor domains. As art education involves subjective, personal, emotional and spontaneous activity it was classified as belonging mainly to the affective domain. This resulted in a one-sided emphasis on the significance of the arts as focusing on the emotions. On the other hand, however, this Bloomian tripartition has been criticized even by Bloom himself. The importance of considering the holistic nature of the human individuals has been brought forth. This view implies that it would be inappropriate to even conceptually separate the personal and emotional factors from cognitive and psychomotor activities.

In order to investigate and understand the emotional and cognitive meaning of art in greater detail, we must first define what we mean by these terms.

1. The Concepts of Emotions and Cognition

1.1. The Concept of Emotion

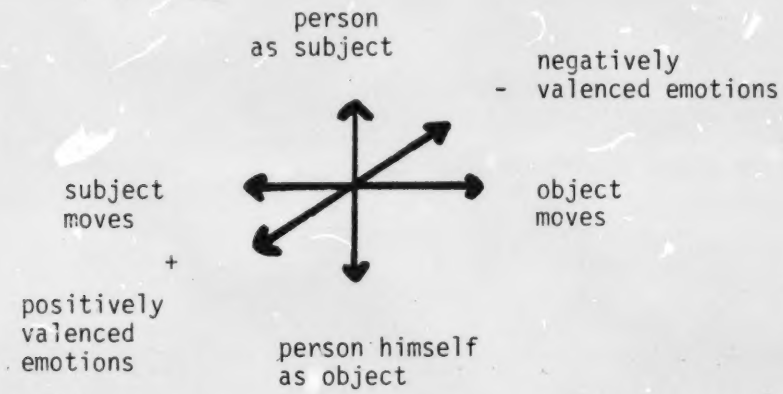
According to DeRivera (1977) there are at least three different kinds of emotional theories. Most of these theories suggest that emotions are related to instincts. A second class of theories relates emotions to the perception of value in the person's environment. A third class suggests emotions as transformations of the relation between the person and his environment. In these theories the person is conceived to be inseparable from the world in which he finds himself. Of the numerous existing theories on emotions I take as the theoretical frame of reference DeRivera's own structural theory, because it offers important ideas in connexion with art and other aesthetical experiences.

The term "emotion" is derived from the Latin word "emovere", which literally means "to move out": the essential feature of an emotion is an experience of being moved. When an emotion moves us, we feel a desire to act, to touch, to kiss, to strike, to escape etc., even though our conscious control and our judgement of the situation may precent the action. This is what DeRivera calls the paradox of emotional experience: that we are passively being moved rather than acting and yet the movement seems to be coming from within us. According to the structural theory of emotions this is explained by the fact that in experiencing an emotion we have internalized our relations to the world: to the people, the objects, the nature, the events, etc., which are important to us. The emotional experience reflects transformations of our relation to the world. These transformations are the movements of emotion and each type of emotion (anger, fear, love, desire, etc.) reflects a different kind of transformation. An emotion is no passive reaction to a stimulus situation but always a transaction (interaction) between the individual and his environment and a way of organizing this relation so that the emotional reaction provides the situation with a personal significance and meaning for the individual.

Even though each emotion involves its own transformation to the world, they also form an interrelated holistic structure, in which each emotion has some kind of a relation to all the others. In a certain respect we are free to choose our emotional reactions towards a situation. But after doing so the complex net of emotional relations is determined.

In DeRivera's emotional theory the basic unit is the subject - object -dyad (see figure). The person experiencing an emotion is always the subject of the emotional movement. His emotions can focus on an external object such as other people, nature, art etc. (it-emotions) or the person himself can be the object of his emotions (me-emotions). Also me-emotions are always transformations of relations to the external world. They have arisen from prior experiences, particularly of the way in which people important for us (like our parents, teachers, etc.) have emotionally responded towards us and also towards themselves, and other objects.

Figure 1. Basic Units of Emotions



(see DeRivera 1977, 70)

Another important dimension in the analysis of emotions is the direction of the movement they contain: whether the emotion seems to move the subject towards the object or the object towards the subject. A third factor is the generally experienced valence of an emotion: whether it is positive, as in emotions involving love, esteem, humility, tenderness etc. or negative as in emotions involving hate, depression, fear, etc. In this context we might note that DeRivera calls emotions many such feelings which often are not considered emotions, such as esteem, serenity, and calmness.

DeRivera distinguishes a positive movement toward the other that alters the position of the self (for instance affection, devotion, tenderness,

love) from a positive valenced movement towards the other that brings the other to the self (such as desire, fascination, longing). The loving person 'gives' his love to the object: to an other person, to the nature, to an art object etc.; the movement of getting is the subject moving towards the object better than on the contrary. In desire, for instance, the subject wants to get the object, to have the object to come near him, to belong to him etc.; thus the movement is that of the object to the subject. When discussing the names of emotions, DeRivera considers the difficult semantic problems of using different kinds of names referring to the concept of emotion. Characteristic of the emotion of love in his terminology is giving and for desire getting. Thus he is not discussing the sentiment of love, which according to him involves the entire cluster of both giving and getting emotions.

Each particular emotion is the result of choices which organize our relation to the object. Thus emotions have features in common with perception. Both consist of active behaviour on the part of the individual even though neither is outwardly visible as such. In both a certain object involves the self, 'moves' him to such internal activity which does not realize information received from the outside world as such but transforms it to be meaningful to the relation of the individual to the world.

1.2 The Concept of Cognition

In this taxonomy of educational objectives, Bloom denoted the aspects associated with knowing and understanding as the cognitive domain. The Latin term "cognitio" in the singular means knowledge, knowing, but it should be noted that in plural it refers also to images and views. The term cognition in psychology denotes processes of perception, thought, imagination, etc.

In cognition consciousness is a central term. It can be defined to denote all such recognized concepts and concept systems which have been formed on the basis of previous experience in the form of memory traces (see Heikkurinen 1971, 110).

The separate sensations which we receive from the external world by means of our senses are processed in the central nervous system and transformed

into perceptions, i.e. they are perceived to compose certain holistic entities, which do not perfectly correspond to the outside world because of the uniqueness of our experiences.

Thought is often defined as any activity "inside the head" ranging from daydreaming to formulating the concept of relativity. Many authors (e.g. Kagan 1966, McFee 1970) avoid using the term thought and speak instead of processing information. Heikkurinen (1971, 114) has defined thought as follows: "From stimuli the individual receives interpretations in the form of recognized concepts. By means of his thought processes he guides these interpretations in his consciousness, orders relations between the concepts, draws consequences based on the recognized concepts, and if required transforms the results of the points mentioned above into products which are perceptible to other people."

Imagination as one form of cognitive processes is closely associated with thought (Scruton 1974). Imagination involves thought which is unasserted and which consequently goes beyond what is believed. Thus a man is not said to be imagining if he produces his account on the basis of what he already knows. Compared with thought processes, imagination seems to be characterized by greater intenseness, exact duration and concrete sense impressions, that is why Scruton classifies it between thought and sensation. Occasionally we speak of passive and active imagination depending on whether the imagination kindles activity in the individual to construct and/or reconstruct interaction between himself and his environment. Conceptually, however, imagination seems to be characterized by its quality of a strongly intra-organismic experience, although it may produce action that is perceptible also to others. The basis of all imagination as well as of all other forms of cognitive processes must, however, be seen in the individual's preceding experiences and interaction with the environment. This is the case also in so-called passive imagination.

A problem of cognition in context with visual art education is the question, whether we can speak of visual thought and concept formation, and what significance we accord to imagination along with thought in the cognitive processes. These issues are considered in more detail in chapter 4 when we discuss the cognitive significance of visual art.

2. The Knowledge of Brain Function as a Basis of the Emotional and Cognitive Significance of Art Education

The emotional and cognitive character of art has generally been discussed as a philosophical question. When those believing in the conclusive strength of empirical research have failed to become convinced of the adequacy of philosophical arguments as a basis for educational planning, the proponents of art education have attempt to find a basis for art education that would satisfy the expectations of the empirical research ideal, too. Such a basis has been sought for in the results of research on the neuro-physiological functioning of the brain (see e.g. Eisner 1975; Hart 1975; Rennels 1976; Scheid-Eccles 1976; Gardner 1977, 1978). In what follows we sketch briefly and with considerable simplification some pertinent views on the function of the brain and on the significance of this information for art education.

Of special interest in this context are a) the theory of the historical development of the brain, which has been used particularly in attempts to understand the aesthetic and creative significance of the influence of art on emotions and b) the knowledge about the action of the cortical brain hemispheres, which has been used to clarify and explain the cognitive significance of art.

2.1. The Theory of the Three Parts of the Brain of Different Evolutional Age

Evolutionally the human brain is often divided into three parts. According to the so-called Papez-MacLean theory these parts are in chronological order the reptilian brain or archicortex, the old mammalian brain or mesocortex or the limbic system and the new mammalian brain or neocortex (see e.g. Hart 1975; Popper-Eccles 1977). The oldest brain directs many homeostatic states of the body. The mesocortex plays an essential part in emotional behaviour and the newest brain operates with various concepts and acts as a kind of site of consciousness. In spite of considerable structural differences these three parts of the brain seem to function together and in close interaction. It is conceptually proper to speak of different brains but it must not be forgotten that

they compose one fuctional whole. Evolution has placed the new brain on top of the old with partly overlapping functions but the new brain does not exercise a particular hierarchical control over the old. The neocortex does act as a restraint on the excessive activation of emotional states, which is often of absolute necessity for the interaction between the individual and the environment. But the interaction between different parts of the brain incorporates an effect in another direction, too: the brain regulating emotions sends messages to the new part of the brain, the state of readiness of which is aroused on account of the activating influence of the emotions. Emotions guide thought.

2.2. The Theory of the Cerebral Halves of the Brain

Even though the knowledge about the local functioning of the human brain is incomplete, there seems to exist virtual unanimity on the functional asymmetry of the cortical brain hemispheres. In neurological brain damage or brain lesion investigations as well as in investigations conducted with so-called normal subjects (e.g. Dichotic listening tests and tachistoscopic presentations of visual stimuli) it has been ascertained that the left brain hemisphere concentrates on prosessing verbal and arithmetic information and on serially structured logical and analytical thought. The right brain hemisphere seems to guide holistic perception and structuring, metaphoric, visual, and parallel information processing, musical activity etc. Rennels (1976) refers to his EEG-investigations which according to him clearly indicate that a small part of adults manifest dominance of the right hemisphere. These people are primarily persons who are actively engaged with art. They have also had an above-average share of difficulties in verbal and numerical subjects in school.

The age-old division into the scientific and artistic ways of structuring reality thus seems to receive support from brain research. It should be noted, however, that the functions of the right hemisphere can neither be regarded as inferior to the left nor as ways of structuring phenomena typical of children. Secondly: in spite of their independent activities also the brain hemispheres interact closely through the corpus callosum. "It is not too much to say that every part of the

brain is connected with every other part" (Hart 1975, 57). It is the close interaction of the different parts of the brain and their mutually activating effects that make it possible for the individual to construct a meaningful whole from the information received from the external world by means of the senses and the information stored in the memory. The fact that the different parts of the brain act in mutual co-operation implies also that in order to be activated, the individual is not dependent only on concrete objects of perception situated outside himself. Also the different brain parts can activate one another, for instance emotions can arouse different mental images, mental images can activate speech or concrete action, etc.

2.3. The Significance of the Knowledge about Brain Function for Art Education

The close interaction of the parts of the brain of different evolutional age - particularly the new part and the limbic system guiding the emotions - has often been interpreted so that the aesthetic and creative significance of art lies in the fact that aesthetic activity can produce a synthesis between these parts of the brain (Viljo 1976). On this basis a kind of equilibrium could be attained beween emotions and intellectual ability, a state which would be experienced as personally meaningful and pleasant.

The concentration of the right hemisphere on the processing of holistic, visual, musical information, the structuring of space, etc. has prompted many authors to label it the artistic hemisphere and on this basis to criticize the western school system for an exaggerated emphasis on the development of the left brain half (see Rennels 1976; Scheid-Eccles 1976; Silver 1978).

The popularization and mechanical utilization of brain research as a foundation for arguments on the importance of artistic activity can, however, be criticized for oversimplification and naiveness (see Leontjev 1977; Gardner 1978). In the first place our knowledge of brain functions is still in many ways incomplete and the results of research are in many respects contradictory. In the second place, we have not been able to define in this manner the ultimate nature of emotions,

perception, concept formation, cognition, aesthetic experience, etc. For even though the actions of human beings are based on the neurophysiological processes of brain, the content of emotions, perceptions, etc. and their manifestation in human mental activities are not determined by the brain alone. Their contents and meanings vary and change by the influence of the environment. Moreover, the localization of these activities has appeared to be dynamic and systemic. Thus emotions and cognitive processes have always to be considered as interactions between the individual and his environment.

3. Emotionality in Visual-Artistic-Aesthetic Activity

The aims of visual art education has generally been considered to develop a) visual-artistic-aesthetic perception, experiencing and appreciation and b) in close contact therewith visual-artistic-aesthetic expression like drawing, painting and sculpting. Particularly aesthetic perception, experiencing and appreciation as well as creative and personally expressive producing are regarded as emotional activity. Any given emotional reaction, however, is neither aesthetical nor creative. In the theory of aesthetics the peculiar characteristics of aesthetic perception and emotional experience have been sought for.

3.1. Aesthetic Perception, Experiencing and Appreciation

In aesthetic perception, experiencing, and appreciation the subject (the one who perceives, experiences, appreciates art and art productions) and the object of this artistic-aesthetic action are necessary constituents. In general, an aesthetic object is regarded as a real concretely perceptible object outside the individual (e.g. nature, another person, a work of art). Then the corresponding emotions are, in DeRivera's terms, it-emotions. An aesthetic experience can, however, also focus on an internal object (mental images of one's own, dreams, fantasies, thoughts), in which case the emotions are me-emotions. The latter are evidently of central importance in aesthetic expression.

3.1.1. The Interaction Between Subject and Object

It is a well known problem in the aesthetics of art, whether aesthetic perception and experience depend primarily on the subject or on certain characteristics of the object. According to DeRivera's structural theory of emotions, what takes place is an interaction of the subject and the object. Consequently aesthetic perception, experience, and appreciation are influenced both by the preceding cognitive and emotional experience of the subject and by the characteristics of the object, such as, in a work of visual art, the line, colour, form, structure, and kinetic elements and their mutual relations.

3.1.1.1. The Aesthetic Perception and Experience

In attempts to separate aesthetic perception and experience from each other, it has been proposed that the various features of the object and their mutual relations are central in aesthetic perception, while the subjective experiences arising from the memory, fantasy, volition, expectations, etc. of the subject are essential in aesthetic experience (see e.g. Oksala 1978). This distinction may be conceptually meaninful. It must, however, be noted that the distinction is more theoretical than factual, because a person's perception of an external real object never corresponds to "objective reality". A perception is also active interpretation of reality by the organism, an interpretation that has been produced by earlier experiences and inborn qualifications.

The notion of a work of art as an intentional object (see e.g. Merikallio-Nyberg 1974; Oksala 1978, 93) probably incorporates the view that both the aesthetic and artistic nature of the object are determined through the perception of the subject and the interpretation he furnishes for it by means of thought, imagination etc. This interpretation takes place on the basis of the interaction of the subject with his environment, i.e. the culture, period, society, etc., but always modified by the consciousness of the individual. Thus it is possible that a natural object such as a rock can be made into a work of art by the intentional creative activity of man (either by means of concrete perceptible action such as sculpturing, painting, etc. or imagination and thought).

3.1.1.2. Aesthetic Appreciation

In addition to aesthetic perception and experiencing we also speak of aesthetic understanding and attitude. Understanding refers to becoming conscious of the real nature of the object. By aesthetic attitude we mean such an overall relatively stable state of mind on the part of the subject, which is aimed at the formation of aesthetical experiences stimulated by the environment. In this context we could also speak of an aesthetic way of life, in which the subject regards such an attitude towards life as valuable. Aesthetic appreciation, which involves the critical examination of the object and the deliberation on its aesthetical value, would be used here as a general concept. What is of importance in this respect is a) the striving towards the understanding of the real nature of the object (aesthetic understanding) and b) the experiencing of such activity as important and valuable (aesthetic attitude or way of life).

It has often been thought that aesthetic perception, experiencing and appreciation imply the formal scrutiny and evaluation of objects of art and works dealing with beauty. It has been argued that an individual is aesthetical, if he is capable of analyzing such matters and if he has a refined, sophisticated taste (see Brothwell 1976; Saarnivaara 1979). This would mean that aesthetic activity could be possible primarily only for artists, critics, and such laymen who have consciously attempted to develop in themselves such a way of observing the world. It is seldom that we in everyday language speak of aesthetical experiences. Instead we speak of a beautiful landscape, a good book, a fantastic reading experience, a splendid or grand painting etc. These experiences can nevertheless be interpreted belonging conceptually to the class of aesthetical perceptions and experiences. Thus aethetical experiences are in some way characteristic of all people.

3.1.2. The Intrinsic and Extrinsic Value of Aesthetical Activity

One general problem in aesthetics is whether it is possible to separate the aesthetic perception, experience or appreciation from other, e.g. theoretical, practical, moral, religious, etc. activities. Many

authors (see e.g. Dickie 1974; Viljo 1976; Wilenius et al. 1976; Oksala 1978) hold the opinion that it is not possible to separate aesthetic activity per se from others. It would, however, perhaps be more appropriate to say that they do not manifest themselves separately in the life of the individual. Conceptually it should be possible to speak of the aesthetical in so far as it is altogether possible to classify human experiences and activities into different domains.

Henderson (see Brothwell 1976) has like many others brought our attention to the fact that the function of art is not merely aesthetical nor is its main objective the experiencing of beauty. A work of art can also be experienced as ugly, horrifying, unpleasant, weird, etc. Thus it is perhaps in no way regarded as aesthetical in spite of the fact that the work of art can nevertheless be of high artistic quality. This shows that the aesthetical and the artistic are not identical concepts. Art can have several functions beside the aesthetical. If the artist is capable of effectively using artistic means to transmit the content of these other domains, the work of art can be regarded as an artistic, well-executed medium of this content, although it is not necessarily experienced aesthetically at all. For instance a political or religious conviction can act as a completely appropriate starting-point for the definition of some work of art. We can assume that this is what has happened when visual environmental education and mass media education are classified belonging to visual art education. Thus an important task of art is seen to be the reflection of human social reality. In this case, however, the intermediary nature of art in pursuing other objectives may be overemphasized. If the value and function of art and artistic-aesthetic activity are determined on the basis of conditions set by these, not primarily artistic domains, then art and artistic activity will become a means of manipulation for these domains.

3.1.3. The Emotionality of Aesthetic Perception, Experience and Appreciation

It is generally considered that a certain emotional reaction which an object produces in an individual is characteristic of aesthetic experience. We have noted above that this emotional reaction is produced as an interaction of the subject with the object through the consciousness

and emotional experiences, i.e. the interpretation and internalization on the part of the subject. Dewey (1934) emphasized that no experience can be aesthetical unless it produces emotions. According to Vivas (1962) the presence of emotion cannot be considered a defining feature of aesthetic experience, because the presence of emotion in connexion with aesthetic experience varies considerably as a consequence of knowledge and training. Saarnivaara (1979) holds the opinion that it is possible for one person to react emotionally to an object and for another to react to it without emotion and that both nevertheless experience it aesthetically. It is somewhat difficult to understand what is meant by this, if emotions are understood in the sense of DeRivera's theory. Obviously a person, who experiences an object aesthetically without emotions, "knows" intellectually that the object, a painting, a composition etc., is aesthetical (beautiful, for instance). In connexion with visual art the term aesthetical would then apparently denote the recognition of the harmony of content, colour, form, structure, and other visual elements as skilfully performed activity intended to produce a work of art. We would perhaps speak of aesthetical perception, which we above noted to be dependent on the features of the object. It can, however, be doubted, whether aesthetical experience or even perception is possible without emotions. Already the concept of experience seems to imply the presence of emotion. It is difficult to imagine a personal aesthetical experience which would not be associated with a feeling of pleasure, balance, harmony, etc. produced by the experience and appreciation focused on the object.

Another problem associated with the emotionality of aesthetical experience is the fact that one individual experiences an object to be strongly aesthetic and another does not. This difference is explained by the different experiences and qualifications of individuals. Undoubtedly there is a great difference in the possibilities of a professional artist or art critic and a layman taking slight interest in the arts to receive an aesthetical experience while regarding a work of art. Knowledge and experiences about pursuing artistic-aesthetic perception, expressional means and techniques, the content of works of art, and valuing artistic-aesthetic experiences as an important part of everyday life are decisive in determining whether an emotional and aesthetical relation to the object is produced.

In addition to the absence of knowledge and experience also the emotional structure of the individual can prevent the emotional experience. The fact that the individual "chooses" to react by e.g. fright, shame, desire, etc. in a situation involving aesthetical appreciation, may prohibit an emotional aesthetic attitude towards the object. In so-called need hierarchy theories it has been emphasized that the basic needs such as the need for food, warmth, etc. have to be satisfied before it is possible to satisfy the higher-level spiritual needs, such as those for self-realization, aestheticity, etc. In the last years such a hierarchical and "authoritarian" view of needs has been criticized (see e.g. Berlyne 1971; Viljo 1976; Beck 1974). The significance of such activities as self-initiated action, aesthetical activity etc. as equal with the others for leading a successful life has been pointed out. Although the failure to satisfy the needs of the aesthetical domain, for example, does not have as rapid and immediate effects on the survival of the organism as in the case of hunger, for instance, it is obvious that "one can die of inactivity and ugliness": human meaningful life and existence withers away and the individual becomes a manipulable impersonal robot.

In studies of artistic-aesthetical perception, experience and appreciation there has often been an emphasis on unselfishness and the intrinsic value per se without other, mediating functions. Nevertheless Saarnivaara (1979, 7) asks quite justifiably whether a work of art can even as a 'pure' aesthetic experience be a value in itself, desired on account of itself. If this problem is considered on the basis of DeRivera's emotional theory, aesthetic experience and appreciation are obviously characterized by a positively valuated emotional state, in which the motion of the subject towards the object is more typical than the motion in the opposite direction. The object is appreciated on account of itself, not because the subject could concretely profit from it. In other words, it is as if the subject would give his appreciation to the object: surrender to it. In DeRivera's theory the close relationship of this kind of valuation with the emotion of love is emphasized. This kind of aesthetical experience is characterized by the wish to experience and preserve a moment with the object for its own sake, and the emotion can involve unselfishness, freedom from personal interest, peacefulness, sensitivity, harmony, joy, etc. In such an experience the true nature of the object is accepted as such. In this context we

often speak of the striving of art towards the truth, towards finding the true and unique nature of the object. In this respect aesthetical experience and appreciation are closely associated with the ethical. If the object of aesthetical appreciation is another individual, we attempt to experience and value his beauty as a real human being. In this experience there is respect for other individuals and life in general. Consequently, the mediating nature of aesthetical activity would consist in the first place of the fact that the subject himself obtains pleasure and satisfaction by means of the feeling of this valuation, acceptance, respect, harmony, etc. Tagore expresses this beautifully:

> "When a feeling is aroused in our hearts which is far in excess of the amount that can be completely absorbed by the object which has produced it, it comes back to us and makes us conscious of ourselves by its return waves. When we are in poverty, all our attention is fixed outside us, - upon the objects which we must acquire for our need. But when our wealth greatly surpasses our needs, its light is reflected back upon us, and we have the exultation of feeling that we are rich persons." [1]

On this basis the fact that an object is experienced as ugly, strange, obnoxious, terrifying, frightful, etc. could be interpreted to indicate that the observer has failed to find the real nature of the object. This may depend either on the subject himself and/or the fact that the real nature of the object is hidden. For example in a work of art the content, form, technical skill and/or the intention of the artist may for some reason not be in harmony with each other. Similarly, another individual when being the object of our perception may be hiding his real nature behind defensive role behaviour.

Dewey (1934) has emphasized the internalization and assimilation of a person into aesthetical experience. Saarnivaara (1979) regards the position advocated by Bullough (1962) as opposite to that of Dewey, because the latter emphasizes the necessity of keeping a certain distance to the object in aesthetical experience. When considered on the basis of DeRivera's emotional theory, these views do not necessarily appear to be in opposite with each other. An individual can become deeply involved in his emotional experience for instance in a feeling of love, acceptance and harmony and still experience himself to be an

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[1] Tagore, Rabindranath. 1917. Personality.

experiencing self, separate from the object even when the object is internal (e.g. fantasies of one's own, dreams, mental images, etc.).

3.2. Artistic-Aesthetic Producing/Expression

We have discussed primarily the emotionality of artistic-aesthetic perception, experiencing, and appreciation. An important part of artistic activity is constituted by artistic expression and producing in a form perceptible externally by means of words, pictures, music, etc. In addition to communication with others, such concrete activity has an important function associated with perception and experiencing: through action the picture, the perception of reality gains additional structure, is clarified, and internalized personally.

3.2.1. The Creative and Expressive Function of Artistic-Aesthetic Expression

We can observe the emotional nature of concrete artistic producing such as drawing, painting etc. in its creative and personally expressive function. At the stage of planning and ideation, a work of art (a painting, a piece of music, a dance, etc.) exists as some kind of an idea or mental image - more or less clear and differentiated - in the mind of the subject. At this stage a work of art is an internal object and the feelings focusing on it are essentially me-emotions. This is to say that the object of aesthetic perception and appreciation is the subject himself and his psychic processes.

When producing an artistic object the subject is trying to solve some kind of problem existing perhaps as an idea in his mind. We can say that this 'problem solving' based on earlier experiences stored in the memory is experienced as creative and personally expressive activity, when there arises a feeling of balance between one's emotions, knowledge and skills. This leads to the experience of succesful problem solving: the idea has got its intentional form and the process of producing it has been personally meaningful to the subject himself. The exact way in which this balance or equilibrium is born and becomes possible may be a conscious process; more often it is, however, to a great extent uncon-

scious. This has given rise to the view of the mystery of creativity and unexplicable intuition. Particularly when the idea to be realized, the problem, is not experienced as generally, for instance socially, significant, we often speak of mystical experiences. From the individual's point of view creative activity can have significance and meaning also in this case although the meaning cannot be understood from the outside. Also in this case, however, what takes place is always an interaction between the individual and his environment and a transformation at the level of perception, thought, and emotions in a manner meaningful from the point of view of the individual at a given moment, although this manner may not always be appropriate from the point of the interaction of the individual and his environment (for example in various psychic disorders). The notion of mystical experiences stems from the fact that we have not sufficient knowledge of those emotional and cognitive experiences on which actions are based.

In creative and expressive activity what takes place is always a co-operation of emotion and intellect. Thus optimal creative activity is made impossible by various emotional obstructions, e.g. fears, anxiety, isolation of feelings, etc., and/or the absence of relevant knowledge or skills.

4. Cognition in Visual-Artistic-Aesthetic Activity

In the preceding chapters we have discussed artistic-aesthetic perception, experiencing and appreciation as primarily emotional activities. In these reflections there have, however, appeared features, in relation to which many authors (see Langer 1967; Goodman 1969; Smith & Smith 1970b; Broudy 1978) remind us that emotion in art becomes cognitive.

4.1. Emotionality as Cognition in Art

Langer (1967) and Goodman (1969) have emphasized the cognitive, informative character of emotions associated with the artistic-aesthetic object. Langer considers imagination to be of great importance in the realization of art and reminds us of the fact that a work of art can

never be an exact copy of a physical object. A work of art must thus be seen as a symbol, which is capable of representing a certain emotion and internalized knowledge and interpretation of the object which is put into the symbolic form. Goodman emphasizes that it is by means of emotions and sensitivity that the individual is capable of seeing and becoming conscious of the characteristics of a work of art (its true nature, see above) and of phenomena of human life in general. Art is consequently no mere medium of emotional pleasure: it involves a unique aspect of knowing. The significance of artistic-aesthetic experience is thus emphasized by the fact that it increases human knowledge and widens consciousness.

4.2. Visual-Artistic Concept Formation, Thinking and Imagination as Cognition

It is in context with intellectual activity, thinking and concept formation that the cognitive significance of art has lately been emphasized. In visual art and art education the informative and communicative character of visual elements (such as form, colour, motion etc.), symbols and concepts has been emphasized. By their means we are able to manage the spreading of information and, if necessary, to use them in our own thinking and communication.

Dewey (1934) spoke of art as intellectual activity and denoted the form of thought typical of art by the term qualitative. Langer (1953) denoted it by the term nondiscursive as contrasted with scientific, logical, rational, serial thinking. The most well-known proponent of the concept visual thinking has probably been Arnheim (1954, 1965).

4.2.1. The Dualistic View of Cognition as Verbal and Perception/Imagery System

McFee (1961, 1970; see also Pickering 1976) has discussed the nature of thinking and concept formation - or information processing, as she calls it - from the standpoint of visual art and art education on the basis of the perception-delineation theory. The basic idea in this theoretical model is a conception of visual activity as cognition, which McFee (1970) defines to be the process of thinking, becoming aware, solving problems,

relating, differentiating, organizing, reflecting, and innovating. Percepts and concepts can be remembered, expressed or communicated to others through iconic or word symbols.

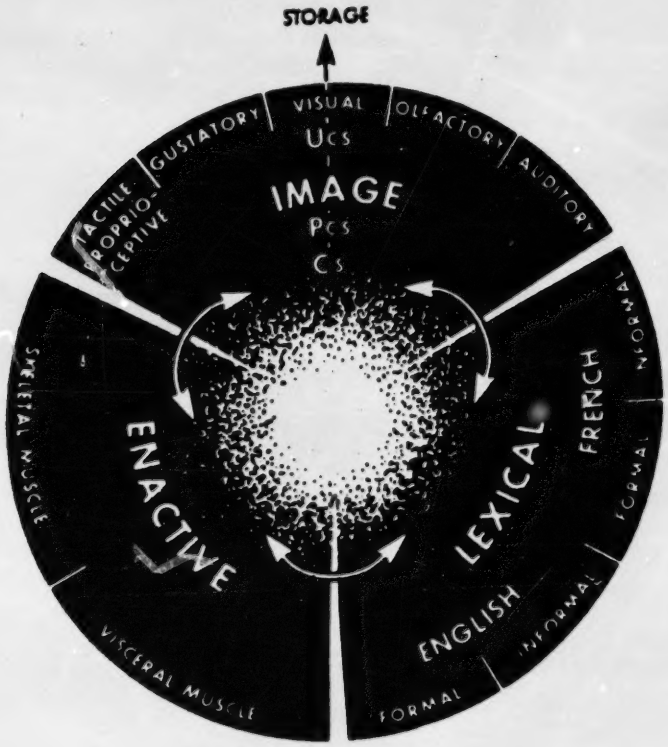
McFee sees the processing of information as consisting of essentially two types: On the one hand verbal, in which case she speaks of real concept formation, and on the other hand visual processing, which she considers more concrete than the former, i.e. it operates with concrete perceptible concepts. One of the best known investigators having same kind of view is Paivio (1967, 1970, 1971). Also he assumes two principal code systems in information processing and calls them the verbal and the imaginal systems. An analogy to the investigations referred above on the asymmetric functioning of the cortical brain is evident. The imagery system is assumed to be specialized for processing nonverbal information stored in the form of images which are analogue representations of perceptual information. Although images are said to occur in all of the sensory modes, Paivio has concentrated on the visual modality as the most frequent and most important imagery mode. The verbal system deals with abstract linguistic units that are only indirectly and arbitrarily related to things. Thus mental images and words are assumed to constitute basic elements of the thought process: of concrete representational thinking (which is also called visual or imagery-like thinking) and abstract logical thinking.

On the basis of Paivio's thoughts Strömnes (1973, 1974) has in his investigations emphasized the fact that the concrete perceptible reality acts as a basis also in verbal concept learning. In other words, he considers visual image formation to be of primary importance in processing information and basis for all kind of thinking. The mental images can be of other types than visual. Their majority is, however, according to Strömnes, experienced as visual and spatial, which is explained by the fact that vision can be regarded as the most dominant of the human senses (see also Ryle 1949, 233-244). It is for this reason that also verbal language consists to a considerable degree of a vocabulary associated with vision (e.g. mental image, verbal image, model, construct, structure) and various metaphors based on pictures are of great importance in scientific concept formation, too.

4.2.2. The View of the Three Dimensions of Information Processing

Horowitz (1978a, see also Singer and Pope 1978) speaks of three dimensions of cognition and its expression: enactive, imaginal and lexical, which according to him take place simultaneously in common active thought and concept formation (figure 2). This three-modality model is partly

Figure 5. Systems of representation of thought



(Horowitz 1978b, 38)

based on the well-known classification by Bruner (1966) into enactive, iconic, and symbolic representation and partly on Guilford's (1967) view about the structure of intellect, which he divided into content, operation, and product categories. The content categories as a mode of representation were subdivided by Guilford into figural, symbolic, semantic, and behavioural classes.

"Enactive depicts information in trial actions, with minor tensing of muscles. Competing action tendencies can be compared and the flow of

enactive thoughts may be reflected in micromomentary gestures and facial expressions. These trial actions, through anticipatory tensing of various muscle groups may be regarded as thinking through enactions", says Horowitz (1978b, 38). Thus the individual would receive information by means of concrete activity: moving, touching, doing with his hands for instance by drawing, painting etc., facial expressions, etc. and this information would be stored as one form of representation in the information processing system of the individual.

Imaginal and lexical modes of representation of thought, again, are defined as in Paivio's and McFee's models above. Horowitz, however, has divided the image system into categories explicitly by means of the sensory modes: auditory, visual, olfactory, tactile and gustatory.

Singer and Pope (1978, 9) emphasize the fact that enactive or image type cognition is no more primitive form than cognition of verbal or lexical type; all three are in complex interaction with one another and are of equal importance also in the adult individual. In other words, according to this view, even in the adult, imagination, daydreams, fantasies and dreams, for instance, are not considered regressive phenomena or immature processes, as e.g. Piaget's conception of the development of thought from the concrete to the abstract can be interpreted (see also Russell 1960; Heikkurinen 1971; Rennels 1976). Singer and Pope criticize Freud in this context for the fact that while he did pay particular attention to dreams, mental images, etc., he nevertheless assumed that a well-analyzed, conscious, adult relies more on so-called secondary-process thinking. Imagery-laden thinking was played down in favor of directed, logical thought. The authors refer to Kris' famous slogan "regression in the service of the ego", according to which in creative thought and activity such as art the individual momentarily regresses into more primitive forms of cognitive processing. According to the profferred criticism it is not a question so much of a phenomenon of the human central nervous system as of a valuation of western ideology centering on the superiority of rational, logical, and verbal thought, which implies that any reliance on fantasies, dreams, etc. is a regression to a lower level.

4.2.3. The Figurative and Operative World of Cognition

The view of dualistic information processing has been subjected to criticism. In principle, the same criticism is applicable to the three-dimension model. Yuille and Catchpole (1977) for instance hold the opinion that even though in such a model, in emphasizing the importance of mental image formation a critical attitude is adopted of the view of the nature of the organism as passively reacting to the stimuli of the environment, what we really have is only a variant of traditional S-R -thinking. In it stimuli external to the central nervous system are seen as causes of the modalities of cognition. In other words it harbours an at least implicit assumption that information is contained in words, images, etc., and no more abstract (or general) form of knowledge is proposed. What causes an individual, for example, to direct his activity towards one form of representation rather than another is left undefined.

4.2.3.1. Schemas as Agents of Structuring of Internal and External Reality

The abundant psychological research of recent times has repeatedly brought forth Piaget's idea that certain abstract (i.e. not analogous to the senses) mental structures are the foundation of human knowledge. In the process of explaining the basic nature of information processing, a term often used is schema (see von Wright et al. 1979; Stotland-Canon 1972). For the organism a schema acts as a frame of reference and a structuring agent for the selection of perceptions received from the external and internal world. At least the terms construction, frame, and script have been used to denote the same concept. With the aid of the concept of schema investigators of cognitive processes have attempted to explain the nature of the individual's internal representation of his surrounding reality, how he learns, stores, and uses information from the outer world.

In a schema we have well-structured information ready, so to speak. The orientation towards a new situation does not demand much else than filling in the blanks in the schema according to the information furnished by perception. A schema dealing with knowledge is composed of prior experiences and the inborn psychophysical prerequisites of the individual. The more varied our experiences are and the more conscious we are of them, the less blanks there are in our schemas and the easier it is for us to evaluate a

new situation and its significance to us. Schemas vary considerably from one individual to another as to their breadth, generality, etc., and each individual has subschemas of varying generality.

The information processing as different modes of representation on the one hand and the schemas or structures of knowledge on the other must evidently be seen mutually reinforcing phenomena of thought and information-processing. Piaget (Piaget and Inhelder 1971; see also Yuille and Catchpole 1977; Gardner 1977, 92) speaks in this context of the figurative and operative world of knowledge. With figurative he means a representational form of cognition, referring to a relatively clear and explicit reality or to elements of such a reality. Among the most obvious instances of these elements are mental images formed by various concrete objects, music playing in one's mind, inner speech, etc. The operative level is a storehouse of an individual's basic knowledge, which contains generalized schemas. In contrast to Paivio and Strömnes, Piaget does not regard e.g. images as being produced by perception but rather as consequences of applying an operative schema to the object being regarded, irrespective of whether this object is external or internal, e.g. something the person is thinking of, dreaming of etc.

Nevertheless, also Piaget considers the image to have great functional importance. According to him, however, the accuracy, lifelike nature, etc. of the mental image acting as a symbol depends less on the original object than on existing schemas. Words, mental images, etc. are tools for thinking, not thinking itself. The fundamental form of information processing is not in the form of images or words or sounds or any other sensory analogue. Basic knowledge must be in the form of general non-sensory code generated from experience and capable of reconstructing specific internal representations (e.g. dreams, mental images, inner speech etc.) as well as external representations (e.g. spoken language, pictures etc.). The abstract plane of thought is engaged in the generation of rules (i.e. schemas), a process which is supported by the activity of the representational modes. These rules reflect the similarities, coordinations, interrelations, abstractions (generalizations), categorizations, structures, etc. that the mind imposes upon experience. The systematic frame of reference, schema, produced by these rules reflects the degree and quality of cognitive complexity by the individual on the basis of his experiences. If these schemas are developed one-sidedly

towards e.g. processing verbal information by means of systematic education, then processing of other types of information, e.g. visual, is carried out in an unstructured fashion, haphazardly and unconsciously, in which case the individual is particularly susceptible to the manipulative influence of such information.

On basis of the discussion above we can conclude that it may be inappropriate to speak of visual or verbal thinking, as these terms refer to sensory experiences. On the other hand, we can conclude that if we speak of thinking and concept formation based on verbal language, it is meaningful and possible to use also the terms visual or imagery-like thinking and concept formation. It is, in any case, evident that the schemas structuring information have been formed on the basis of earlier experiences. This presupposes various representations - enactive, imaginal, and verbal - of objects in the minds of people. We can speak of interaction: the existence of schemas is a prerequisite for structuring sensory perception and mental representation, while the information furnished by perpective experiences is a prerequisite for schemas to develop so as to become applicable to the versatile structuring of reality (see also Neisser 1976).

4.2.4. The Figurative and Operative World of Cognition in Visual Art

Because of the fact that the information which is received as well as the way in which it is received by means of the senses can be of several types, it seems natural that the representation in the minds of individuals, the storing in the memory, as well as the processing schemas can qualitatively be of various kinds. Organizing sounds like a composer, motions of the body like a dancer, visual phenomena like an artist, a sculptor or an architect are also activities which are regulated by thought. The differences consist only of the nature of the material used, the product, and the appreciation of the product (see Dewey 1934).

In processing verbal information we need verbal schemas, and we need visual schemas in the processing of visual information. We must, however, not forget that, even though we can make qualitative distinctions between different type forms in the media of thought activity, in practice the processing of various kinds of information takes place in their interaction with each other and even simultaneously. That is why e.g. verbal information may arouse

also visual and other mental images and experiences, and pictures may produce verbal representations depending on the particular schema that we use to structure the world.

In contrasting scientific and artistic activities, the concreteness of art and the dependence of artistic perception on the concrete object and its sensation have been emphasized. On the basis of the discussion above, we can conclude that, from the point of view of human psychic processes, what we are dealing with is in principle no less concrete experience than processing a verbal message. The meaning of both types of entities for the individual is due to interpretation and structuring by means of generalized schemas. The "message" mediated by the visual elements and their interrelations of even a "concrete" object of art may remain inaccessible for the receiver in the same way as is the case with verbal concept systems unless the individual has developed an appropriate model for structuring it on the basis of his earlier knowledge and experiences. In human reality these are, consequently, no "pure" concrete perceptions, i.e. such perceptions that are independent of the schema in question (see also Hanson 1976, 190).

4.2.4.1. The Emotional-Cognitive Structure of Human Functioning in Visual Art

We have above concentrated on discussing cognitive concept formation and information processing and its significance in visual communication and art. In chapter 4.1., however, we referred to the view that it is through his emotions, that an individual receives information about reality. When understood in this way, also generalized conceptions produced by emotional experiences are to an essential degree a part of these information processin schemas. In practice it is impossible to separate the structure of emotions from a cognitive structure independent of them. The formation of various verbal, visual, or imaginal and enactive mental representations from external information takes place on the basis of emotional as well as cognitive experiences and schemas formed from them simultaneously. Some kind of external knowledge may indeed be possible, but understanding, internalization, and the management of activity on the basis of this information cannot take place without an emotional relation to the object. It is only by means of emotional experience that information can be experienced as important

and worth assimilating and personally meaningful. It would thus be more appropriate to speak of emotional-cognitive schemas and structures than of either of them separately.

The process of thinking and of assimilating information must thus be seen as a living human activity, which has in principle the same structure as so-called concrete activity. Thought processes realize certain intentional acts, which are adequate from the point of view of gaining consciousness (Leontjev 1977, 46-80). As in practical doing, thought activity is a response to certain needs and functions and thus both are regulated by emotions.

The fact that thinking is often associated with only verbal and not with imaginal and enactive phenomena is apparently a consequence of not only the sharp distinction between feeling and reason/intellect and the one-sided emphasis on emotions in imagination and art, but also on the fact that the process of transmitting thoughts to others is more easily perceptible when it takes place by means of verbal rather than e.g. visual or other nonverbal symbols. The time that processing information takes may be quite short. Thus serial, lexical information processing may appear to be the only form of thought on account of its temporal duration. Also, we are accustomed (due to e.g. our common education) to communicating (to being conscious that we are communicating) primarily by means of spoken or written language. Even though we speak of nonverbal communication, we usually think that it is not possible to systematically regulate its use by means of education as is the case with verbal communication. Nevertheless, expressions, gestures, the way of dressing, various pictures, visual products of mass media, poems, dancing, etc. are means by which people are in contact with other people, i.e. communicate with another. Also, visual information, for example a picture as a concrete object is often considered so unambiguous that people are expected to be capable of "reading" it without further ado. We are, however, aware of the fact that we often misintepret nonverbal messages (and naturally verbal messages, too) or fail to grasp them at all. Also the content of e.g. mass media, a work of art, and the information it contains may remain completely ununderstandable to us unless we are in possession of the schemas that are necessary for its interpretation.

In additional difficulty in regarding art and visual sign system as a medium of communication is the fact that even though the sign language

and symbol system are generally meaningful and are thus communicable to others in an understandable fashion, the meaningfulness is not of the same kind as that of spoken/written language. Compared with the signs used in visual art, verbal and mathematical symbols have a more distinct basic meaning, which seldom includes alternative or secondary connotations. It is possible to compile dictionaries of verbal language and to analyze synonyms. In art, instead, a rupture with the context leads to the breaking down of the structure of the sign system of art. The visual-artistic language symbolizes a personal reality reflected in a specific way by the consciousness of the individual; or if we again quote Tagore's sensitive reflections:

> In art "we have to use words which have got the proper taste, - which do not merely talk, but conjure up pictures and sing. For pictures and songs are not merely facts, - they are personal facts. They are not only themselves, but ourselves also. They defy analysis and they have immediate access to our hearts."

IV SUMMARY AND IMPLICATIONS FOR EDUCATION

1. On the Significance of Art Education as a Part of the Development of Pupil Personality as a Whole

In this report we have discussed the emotional and cognitive significance of visual-artistic-aesthetic activity. We have seen that in practical situations it is not possible to separate emotions and cognitive processes from each other and that the structuring of reality takes place by means of cognitive-emotional schemas. It can only by means of emotional experiences render possible the conceiving and assimilation of information personally. This view is of decisive importance not only in art education but in all education; also in the so-called theoretical subjects in which learning has been regarded as purely cognitive. The formation of schemas for structuring information takes place as an interaction between the individual and his environment. Thus systematic education and the set of values of the environment influence the way in which these schemas develop.

Artistic-aesthetic activity as the mere liberating of feelings and as therapeutic outbursts of affects cannot be valuable from the educational point of view unless it involves an intention for the action, knowledge about the central concepts and media for communication, and emotional experiencing that widens the conscousness of the individual. Liberating in an educationally significant meaning consists of making a person conscious of his emotions. It must on the other hand be noted that artistic activity may have an important therapeutical significance, when artistic-aesthetic creative activity is associated with knowledge about the purpose of the activity, its content, and ways of functioning as well as skill in using them to express one's own feelings and intentions by artistical means. In this case the activity increases the consciousness about one's own feelings, thoughts, mental images and reactions and consequently increases one's mental health.

1.1. On the Educational Significance of Artistic-Aesthetic Structuring

We have seen that the concept of aesthetic education is more encompassing than that of art education. Thus aesthetical structuring of reality (perception, experiencing and appreciation) can in principle appear in any domain of life and not merely in context with art. It is possible to take this activity into consideration in all education and in the various subjects in order to provide the pupil with an aesthetical way of life as a part of his own philosophy of life. Systematical training in the aesthetical structuring of reality is, however, a natural and central task of art education. It is consequently appropriate to emphasize its significance in this context. From the point of view of the development of the personality as a whole, one of the key questions in a subject-oriented educational system is the question of the possibilities of integration between the various subjects at developing an aesthetical way of life.

We have established that such a positively valued emotional state in which the subject values the object primarily of its own sake and not because he might directly profit from it is characteristic of aesthetical experiencing and appreciation. Such a way of life is characterized by unselfishness, respect for the real nature of the object etc. and has been seen to be associated with a moral and ethical attitude, too. This view has also social implications on the relations between people. For the individual himself, regular aesthetical experiences, "giving oneself" to the object and the feelings of harmony, pleasure, fascination, rapture, being moved by the object, etc. may lead to experiencing life and its various phenomena as significant and important. We can surmise what effects such an aesthetic way of life could have on the possibilities of reducing the feelings of alienation, boredom, disinterest in matters, discipline problems etc.

Important in the development of aesthetical appreciation is specially the striving towards aesthetical evaluation. Thus we are not content with regarding any object whatever as aesthetical, e.g. beautiful, harmonious and humouristic. Decisive in the aesthetic quality of for example a work of art is the correspondence between intention and realization, the "real nature" of the object. How critical an examination

an individual is capable of, depends on structuring schemas developed by means of experiences and systematic guidance. Our experiences in aesthetic structuring increase our possibilities of having structured, versatile and vivid aesthetical perceptions and evaluations in the same way than our experiences in love increase our ability to love.

1.2. On the Educational Significance of Artistic-Aesthetic Producing

We have discussed the characteristic features and function of art as gathering information about the world by means of concrete action. In order to survive, it is no longer necessary to produce manually clothes, utensils, dishes, etc. This is why the share of such concrete activity in formal general education has decreased. In the preceding discussion we have advocated the view that such activity nevertheless has great significance for the development of the personality as a whole, as active doing for its own sake as well as a means to produce information from the environment. Through action the image of reality gains further structure, is clarified, and internalized personally. By means of artistic activity it is possible to receive holistic information via perception, feelings, and concrete doing. The information is stored in our central nervous system as enactive, imagery-like and verbal representations. It would seem that this way of processing information would be more permanent and meaningful than processing merely verbally transmitted information.

It must be stressed that also imagination as active mental action has an important enactive role. In the educationally significant sense, imagination does not consist of imagining only for the sake of imagining. It also has a certain purpose, although the result is not directly externally perceptible but internal - an idea, a dream, a mental image, etc. The educational value of imagination lies again in whether this activity increases consciousness, understanding reality, the meaningful and purposeful relation of the individual to the world.

1.3. The Educational Significance of Visual Concept Formation and Familiarity with the Visual Symbol System

We have seen that important tasks of visual art education in general education are the systematic development of concept formation and information-processing of this domain and making the pupil familiar with its symbolic language. This information is relevant for all people for them to be able to receive mass media information and evaluate it critically, not only aesthetically but also from the point of view of how skilfully and truthfully the content has been communicated. In principle, also developing the visual concept system and symbol language is not a task of solely visual art education (as a school subject). The other subjects such as Finnish (Swedish, English, etc. respectively), social studies, and mathematics have considerable possibilities for teaching skills of this kind. It is, however, by means of perception, evaluation, and activity in visual art education that developing them naturally takes place. By means of visual art education as a school subject it is possible to furnish the pupils with knowledge about visual elements, the function and use of mass media and train them to make vivid and personal observations about their environment: nature, man, his activity, and the products of his activity such as art, the products of massmedia, etc.

In spite of the apparent concreteness (visibility) of pictures and visual information in general, understanding them cannot be regarded as an autonomous process, which could succeed without systematic guidance any better than reading books could succeed without having been taught to read or performing calculations without having been taught how to. Ultimately the problem is a value-problem: whether the visual-artistic-aesthetic activity sketched above and the emotional experiences inherent in it are considered important enough for the holistic social existence of the individual so that sufficient concrete prerequisites are supplied in formal education for guiding these activities.

1.4. The Holistic Educational Significance of Artistic-Aesthetic Activity

We have seen above that the educational significance of art cannot lie in providing an outlet for affective outbursts without the associated process

of increasing consciousness. On the other hand, neither should the cognitive significance of visual art in developing concept formation and the symbol system in this domain be overemphasized. In my opinion, the significance of visual art education alongside with theoretical studies, pursued primarily by means of verbal media, is in the development of the holistic activities discussed in the preceding paragraphs. It makes it possible for the pupil to receive information about reality simultaneously by means of sensory perceptions, actions and his emotions.

Art is closely connected with cultural history, and thus always reflects social reality to an important degree. So art education thus furnishes the individual with tools for adopting a critical attitude towards various phenomena in society. Among other things this means that the content of an object to be taken up for artistic and aesthetic examination is not inconsequential. The specific nature of artistic-aesthetic structuring and producing as socially meaningful activity - i.e. not only as an end in itself, as a value in itself - lies probably in their holistic nature: in the possibility of increasing consciousness and the experiencing of life in a purposeful and meaningful manner by means of aesthetical, emotional experiences and appreciation as well as by means of active participation and doing.

REFERENCES

Arnheim, Rudolf. 1954. Art and Visual Perception: A Psychology of the Creative Eye. California: University of California Press.

Arnheim, Rudolf. 1965. "Visual Thinking" in Kepes, G. (ed.): Education in Vision.

Beardsley, Monroe. 1958. Aesthetics: Problems in the Philosophy of Criticism. New York: Harcourt Brace & World.

Beardsley, Monroe. 1969. "Aesthetic Experience Regained." Journal of Aesthetics and Art Criticism, 28, 1, 3-11.

Beardsley, Monroe C. 1971. "The Classification of Critical Reasons" in Smith: Aesthetics and Problems of Education.

Beck, Clive. 1974. Educational Philosophy and Theory: An Introduction. Boston: Little, Brown and Company.

Berlyne, D. E. 1971. Aesthetics and Psychobiology. New York: Appleton-Century-Crofts.

Berlyne, D. E. 1974. "The New Experimental Aesthetics" in Berlyne (ed.): Studies in the New Experimental Aesthetics.

Berlyne, D. E. 1974. Studies in the New Experimental Aesthetics: Steps toward an Objective Psychology of Aesthetic Appreciation. New York: A Halsted Press Book. John Wiley & Sons.

Bloom, Benjamin S. - Hastings, J. Thomas - Madaus, George F. (eds.) 1971. Handbook on Formative and Summative Evaluation of Student Learning. New York: McGraw-Hill Book Company.

Brothwell, Don. (eds.) 1976. Beyond Aesthetics. Investigations into the Nature of Visual Art. London: Thames and Hudson.

Broudy, Harry S. 1972. Enlightened Cherishing. An Essay on Aesthetic Education. Chicago: University of Illinois Press.

Broudy, H. S. 1976. "Impression and Expression in Artistic Development" in Eisner, E.: The Arts, Human Development, and Education.

Broudy, Harry S. 1978. "On Cognition and Emotion in the Arts" in Madeja, S. (ed.): The Arts, Cognition and Basic Skills.

Bruner, Jerome S. 1964. "The Course of Cognitive Growth". American Psychologist 19, 1.

Bugelski, B. R. 1977. "Imagery and Verbal Behavior". Journal of Mental Imagery 1, 1, 39-52.

Caws, P. 1965. The Philosophy of Science. Princeton, N.J: D, van Nostrand.

Davies, Ivor K. 1976. Objectives in Curriculum Design. Maidenhead: McGraw-Hill Book Company, Ltd.

Dearden, R. F. - Hirst, P. H. - Peters, R. S. 1972. Education and Development of Reason. London: Routledge & Kegan Paul.

DeRivera, Joseph. 1977. A Structural Theory of the Emotions. New York: International University Press, Inc.

Dewey, John. 1934. Art as Experience. New York: Minton, Balch and Company.

Dickie, G. 1974. "Beardsley's Theory of Aesthetic Experience". Journal of Aesthetic Education 8, 2, 13-23.

Ehmer, Hermann K. (ed.). 1974. Vizuelle Kommunikation. Beiträge zur Kritik der Bewusstseinindustrie. Köln: Verlag M. Dumont Schauberg.

Eisner, Elliott W. 1972. Educating Artistic Vision. New York: MacMillan Publishing Co., Inc.

Eisner, Elliott W. (ed.). 1976a. The Arts, Human Development, and Education. Berkeley: McCutchan Publishing Corporation.

Eisner, Elliott W. 1976b. Reading and the Creation of Meaning. Claremont Reading Conference, 40th Yearbook. California: Claremont Graduate School.

Fizdgerald, Q. W. 1974. Toward a Dictionary of Art Education. Pensylvania: State University.

Gardner, Howard. 1975. The Arts and Human Development. New York: John Wiley & Sons.

Gardner, Howard. 1977. "Senses, Symbols, Operations: An Organization of Artistry" in Perkins and Leondar (ed.): The Arts and Cognition.

Gardner, Howard. 1978. "What We Know (and Don't Know) about the Two Halves of the Brain." The Journal of Aesthetic Education 12, 1, 113-119.

Goodman, N. 1969. "Symbolic Systems, Cognitive Efficacy, and Aesthetic Education". Jornal of Aesthetic Education 3, 4, 123-126.

Gordon, William J, J, 1965. "The Metaphorical Way of Knowing" in Kepes, G. (ed.): Education in Vision.

Grünewald, Dietrich - Sengstmann, Ingelore. 1973. Vizuelle Kommunikation in der Schule. Zur Didaktik eines neuen Unterrichtsfaches. Düsseldorf: Pro Schule Verlag.

Guilford, J. P. 1968. Intelligence, Creativity and Their Educational Implications. San Diego: Robert R. Knapp.

Hanson, N. R. 1971. Observation and Explanation. A Guide to Philosophy of Science. New York: Harper & Row, Inc.

Harris, C. W. (ed.). 1960. Encyclopedia of Educational Research. New York: Macmillan.

Hart, Leslie A. 1975. How the Brain Works. A New Understanding of Human Learning, Emotion and Thinking. New York: Basic Books Inc., Publishers.

Heikkurinen, Toivo. 1971. Tiedostamistavan muutokset ja opettamisen vaikuttamisluonne. Käsiteanalyyttinen tutkimus vaikuttamisyrityksiä koskevan kasvatustieteellisen teorianmuodostuksen perusteista Helsingin yliopiston kasvatustieteen laitoksen tutkimuksia 14.

Horowitz, Mardi J. 1978. Image Formation and Cognition. Sec. Ed. New York: Appleton-Century-Crofts.

Häyrynen, Yrjö-Paavo. 1974. "Luovan toiminnan psykologinen rakenne ja yhteiskunnallinen muotoutuminen". Taide 15, 5, 13-19, 50.

Kepes, G. (ed.). 1965. Education in Vision. London: Studio Vista.

Korsmeyer, Carolyn. 1977. "On Distinguishing "Aesthetic" from "Artistic". Journal of Aesthetic Education 11, 4, 45-58.

Koskenniemi, Matti. 1978. Opetuksen teoriaa kohti. Helsinki: Otava.

Langer, Susanne K. 1953. Feeling and Forms. A Theory of Art. New York: Charles Scribner's Sons.

Langer, Susanne K. 1967. An Essay on Human Feeling. Vol I. Baltimore: Johns Hopkins Press.

Lavatelli, Celia - Moore, Walter J. - Kaltsounis, Theodore. 1972. Elementary School Curriculum. New York: Holt, Rinehart and Winston, Inc.

Leontjev, A. N. 1977. Toiminta, tietoisuus, persoonallisuus. Translation from Russia into Finnish. Helsinki: Kansankulttuuri Oy.

Lowenfeld, Viktor. 1953. Creative and Mental Growth. New York: The MacMillan Company.

Lowenfeld, Viktor. 1954. Your Child and His Art. A Guide for Parents. New York: The MacMillan Company.

Madeja, Stanley S. 1977. "Structuring a Research Agenda for the Arts and Aesthetics." Journal of Aesthetic Education 11, 2, 67-86.

Madeja, Stanley S. (ed.). 1977b. Arts and Aesthetics: An Agenda for the Future. St. Louis: Cembrel, Inc.

Madeja, Stanley S. (ed.). 1978. The Arts, Cognition and Basic Skills. St. Louis: Cembrel, Inc.

Madeja, Stanley S. 1978. "Introduction" in Madeja: The Arts, Cognition and the Basic Skills.

McFee, June King. 1970. 2nd ed. Preparation for Art. California: Belmont.

Merikallio-Nyberg, Arja. 1974. Luovan teon intentionaalisuudesta. Jyväskylän yliopisto: Filosofian laitoksen julkaisuja 1.

Moles, A. A. 1968. Informationtheory and Aesthetic Perception. Chicago. Chicago: University of Illinois Press.

Neisser, U. 1976. Cognition and Reality. San Francisco: Freeman.

Nordström, Gert Z. 1975 Kreativitet och medvetenhet. Den polariserande pedagogikens grunder. Östervåla: Gidlunds.

Ojala, Aatos. 1974. Taiteen koko totuus - totuuden käsitteestä marxilaisessa estetiikassa. Jyväskylän yliopisto: Filosofian laitoksen julkaisuja 1.

Oksala, Pellervo. 1978. Ihminen, kulttuuri ja taide. Filosofisia yleisopintoja 4. Jyväskylä: Gummerus.

Paivio, Allan. 1967. "Paired-associated Learning and Free Recall of Nouns as a Function of Concreteness, Specificity Imagery and Meaningfullness." Psychological Reports 20, 239-245.

Paivio, Allan. 1970. "On the Functional Significance of Imagery." Psychological Bulletin 3, 385-392.

Perkins, David and Barbara Leondar. (ed.). 1977. The Arts and Cognition. Baltimore: The Johns Hopkins University Press.

Piaget, Jean. 1945. Play, Dreams, and Imitation in Childhood. New York: W. W. Norton & Co., Inc.

Piaget, Jean & Inhelder, Barbara. 1971. Mental Imagery in the Child: A A Study of the Development of Imaginal Representation. New York: Basic Books.

Pickering, J. M. 1976. "Visual Education for Young Children" in Brothwell (ed.): Beyond Aesthetics.

Popper. Karl R. - Eccles, John C. 1977. The Self and Its Brain. Berlin: Springer - Verlag.

Read, Herbert. 1943. Education through Art. New York: Pantheon Books.

Read. Herbert. 1970. The Redemption of the Robot. My Encounter with Education Through Art. London: Faber and Faber.

Rennels, Max R. 1976. "Cerebral Symmetry: An urgent Concern for Education." Phi Delta Kappan 57, 7, 471-472.

Ruohotie, Pekka. 1976. Taideharrastukset ja taideasenteet eräiden ammatillisten oppilaitosten opiskelijoiden keskuudessa. Tampereen yliopiston kasvatustieteen laitos. Julkaisusarja A: 10.

Russell, D. H. 1960. "Higher Mental Processes" in Harris (ed.): Encyclopedia of Educational Research.

Saarnivaara, Marjatta. 1979. Esteettinen kasvatus monipuolisen persoonallisuuden kehittäjänä yleissivistävässä koulutuksessa. Käsiteanalyyttinen tutkimus. Jyväskylän yliopisto. Kasvatustieteiden tutkimuslaitoksen julkaisuja 299.

Scheid, P. - Eccles, J. 1975. "Music and Speech: Artistic Functions of the Human Brain." Psychology of Music 3, 1, 21-35.

Schütz, Helmut Georg. 1973. 2nd ed. Kunstpädagogische Theorie. Eine kritische Analyse kunstdidaktischer Modelle. München: UTB, Ernst Reinhardt Verlag.

Scruton, Roger. 1974. Art and Imagination. A Study in the Philosophy of Mind. London: Methuen & Co. Ltd.

Silver, Rawley A. 1978. Developing Cognitive and Creative Skills through Art. Programs of Children with Communication Disorders of Learning Disabilities. Baltimore: University Park Press.

Silverman, Ronald H. 1976. "Goals and Roles in the Art Education of Children" in Eisner: The Arts, Human Development, and Education.

Singer, Jerome L. 1977. "Imagination and Make-Believe Play in Early Childhood. Some Educational Implications." Jornal of Mental Imagery 1, 1, 127-144.

Singer, Jerome L. and Pope, Kenneth S. (ed.). 1978. The Power of Human Imagination. New Methods in Psychotherapy. New York: Plenum Press.

Smith, Ralph A. 1970. Aesthetic Concepts and Education. Chicago: University of Illinois Press.

Smith, R. A. & Smith, C. M. 1970. "Justifying Aesthetic Education." Journal of Aesthetic Education 4, 2, 17-51.

Smith, Ralph A. (ed.). 1971. Aesthetics and Problems of Education. Chicago: University of Illinois Press.

Stotland, Ezra - Canon, Lance K. 1972. Social Psychology, a Cognitive Approach. Philadelfia: W. B. Saunders Company.

Strömnes, Frode J. 1973. "A Semiotic Theory of Imagery Processes with Experiments on an Indo-European and Ural-Altaic Language: Do Speakers of Different Languages Experience Different Cognitive Worlds." Scandinavian Journal of Psychology 14, 291-304.

Strömnes, Frode J. 1974a. "Memory, Models and Language Comprehension." Scandinavian Journal of Psychology 15, 26-32.

Strömnes, Frode J. 1974b. "To Be is not always to Be." Scandinavian Journal of Psychology 15, 89-98.

Taba, Hilda. 1967. "Teaching Strategies for Cognitive Growth." in Bower, E. M. & Hollister, W. G. (eds.): Behavioral Science Frontiers in Education.

Torrance, E. Paul. 1967. Education and the Creative Potential. Minneapolis: The University of Minnesota Press.

White, J. P. 1972. "Creativity and Evaluation: A Philosophical Analysis" in Dearden & al.: Education and Development of Reason.

Wiio, Osmo A. 1977. "Kolmiulotteinen ihminen." Kanava 5, 4, 202-207.

Wilenius, Reijo - Pellervo Oksala - Lauri Mehtonen - Matti Juntunen. 1976. Filosofian kysymyksiä. Johdatusta tieteelliseen ajatteluun. Jyväskylä: Gummerus.

Viljo. Eeva Maija. 1976. Esteettisen kasvatuksen perusteita. Jyväskylän yliopisto. Taidekasvatuksen laitoksen tutkimuksia 1.

Wilson, Brent G. 1971. "Evaluation of Learning in Art Education" in Bloom & al. (eds.): Handbook on Formative and Summative Evaluation of Student Learning.

Vivas, E. 1962. "A Definition of Aesthetic Experience" in Vivas and Krieger (eds.): The Problems of Aesthetics.

Vivas, E. & Krieger, M. (eds.). 1962. The Problems of Aesthetics. New York: Holt, Rinehart & Winston, Inc.

Wright, Johan von - Marja Vaura; - Pekka Reijonen. 1979. Oppimisen strategiat kouluiässä I. Tutkimuksen viitekehys ja esitutkimus. Turun yliopisto. Psykologian laitoksen tutkimuksia 33.

Zis, Avner. 1976. Marxilaisen estetiikan perusteet. Translation from Russia into Finnish. Moskova: Kustannusliike Edistys.

Yuille, John C. and Michael J. Catchpole. 1977. "The Role of Imagery in Models of Cognition." Journal of Mental Imagery 1, 1, 171-180.

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